

REMARKS

Favorable reconsideration and withdrawal of the rejection set forth in the above-mentioned Official Action in view of the foregoing amendments and the following remarks are respectfully requested.

Claims 1-5 and 7 are pending in the application. Claims 1, 2 and 4 have been amended to even more succinctly define the invention and/or to improve their form. Claim 7 has been added to assure Applicant of the full measure of protection to which he deems himself entitled. No new matter is believed to have been added. Claim 1 is the only independent claim pending in the application.

Claims 1 through 5 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Japanese Patent Document No. 2000-66500 (Notani, et al.) in view of Japanese Patent Document No. 06-019300 (Okabayashi).

The rationale underlying the rejection is succinctly set forth in the Official Action. With regard to the claims as currently amended, this rejection is respectfully traversed.

Independent Claim 1 is directed to image forming apparatus in which an electrostatic image is formed on an image bearing member. A developing device develops the electrostatic image in a developing position opposite to the image bearing member. The developing device has a developer container with first and second chambers that constitute a developer circulating route. A developer carrying member is provided in the first chamber to carry the developer to develop the electrostatic image. An agitating and carrying member is provided in the second chamber that has a spiral vane around a rotary shaft to agitate and carry the developer. A rotary member that holds the developing device is rotatable in a route that includes the developing

position. A supply unit supplies the developer to the developer device which is in the developing position. An opening is provided in a wall of the second chamber located above the upper end of the spiral vane of the agitating and carrying member and located downstream in a rotation direction of the agitating and carrying member in a region above the rotation center of the agitating and carrying member in the second chamber in a state in which the developing device is in the developing position to discharge excess developer resulting from the supply of the developer through the opening to the outside of the developing device. An opening and closing member is provided so that the other end of the opening and closing member is pivotally moved about a pivot center at one end of the opening and closing member. The opening and closing member is pivotally moved to a position to open the opening when the developing device is in the developing position. The other end of the opening and closing member is located downstream of the pivot center in the rotation direction of the agitating and carrying member.

In Applicant's view, Notani, et al. discloses an image forming apparatus including a developing device held by a rotary member. The developing device has a first chamber and a second chamber. The second chamber is provided with an agitating and carrying member R2 and an opening through which excess developer is discharged. The agitating and carrying member R2 has a spiral vane R2b provided around a rotary shaft R2a.

In Applicant's opinion, Okabayashi et al. discloses an agitating screw that has a rotary shaft and a blade arranged concentrically with the rotary shaft. An agitating member is projected from the periphery of the rotary shaft between the blades and is arranged with appropriate spacing. The agitating screw has an agitating capacity that is capable of being increased without deteriorating the conveying capacity.

According to the invention of Claim 1 as currently amended, an opening in the wall of the second chamber is located above the upper end of the spiral vane of an agitating and carrying member and downstream in the rotation direction of the agitating and carrying member in a region above the rotation center of the agitating and carrying member in the second chamber. Advantageously, the developer surface and the discharging state is stabilized since the developer that is pushed by the agitating and carrying member is pressed against the wall of the second chamber located downstream and is raised against the wall to discharge the developer through the opening. Further, the other end of the opening and closing member is located downstream of the pivot center in the rotation direction of the agitating and carrying member so that the other end side bringing in the developer is directed to the wall of the second chamber located downstream whereby the developer is discharged smoothly.

Notani may disclose an image forming apparatus having a developing device held by a rotary member with first and second chamber. The second chamber has an agitating and carrying member R2, an opening through which excess developer is discharged and a shutter 71 that opens and closes the opening by pivotal movement aided by gravity. The direction of rotation of the agitating and carrying member R2 is not shown in the drawings of Notani. The direction of rotation as disclosed in the Notani specification is shown in the annotated figure corresponding to Figs. 15A and 15B of Notani enclosed herewith. As shown in the enclosed figure, the developer that is pushed by the agitating and carrying member R2 is pressed against the wall 66 and raised up along the wall 66, but the developer cannot be discharged smoothly since the other end bringing in the developer is far from the wall 66. In Notani, the other end of the shutter 71 is located upstream of the pivot center in the rotating direction of the agitating and carrying member

R2 as shown in the enclosed figure. As a result, Notani's arrangement with the other shutter end upstream of the pivot center is directed away from and does not disclose nor suggest that the feature of the other end of said opening and closing member being located downstream of the pivot center in the rotation direction of said agitating and carrying member.

With regard to the cited combination, Okabayashi et al. only discloses an agitating and carrying member. Notani is restricted to teaching that the other end of the shutter 71 is located upstream of the pivot center of the shutter in the rotating direction of the agitating and carrying member R2. Accordingly, it is not seen that the addition of Okabayashi et al.'s agitating and carrying member devoid of any shutter arrangement for developer discharge to Notani's shutter arrangement that only teaches locating the shutter end opposite the pivot center upstream of the pivot center could possibly suggest the feature of Claim 1 of the other end of the opening and closing member being located downstream of the pivot center in the rotation direction of the agitating and carrying member. It is therefore believed that Claim 1 as currently amended is completely distinguished from any combination of Notani and Okabayashi et al. and is allowable.

Applicants submit that the cited art does not teach or suggest such features of the present invention, as recited in independent Claim 1.

Claims 2 through 5 and 7 depend either directly or indirectly from Claim 1 and are allowable by virtue of their dependency and in their own right for further defining Applicant's invention. Individual consideration of the dependent claims is respectfully requested.

It is respectfully submitted that the pending claims are allowable over the art of record and that the application is in condition for allowance. Favorable reconsideration and early passage to issue of the present application are earnestly solicited.

Applicant's attorney, William M. Wannisky, may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our New York office at the address shown below.

Respectfully submitted,

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FIG. 15A

(図 15 A)



DEVELOPER CARRYING DIRECTION

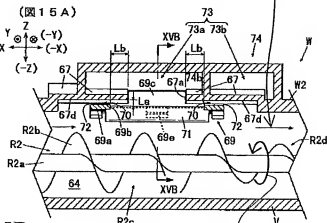


FIG. 15B

(図 15 B)

ROTATION DIRECTION

